

REMARKS

This Amendment responds to the office action dated January 18, 2006.

The Examiner has allowed claims 18, 19, and 28-31.

The Examiner rejected claims 9 and 11-14 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Lee, U.S. Patent No. 6,226,050 and Chien et al., U.S. Patent No. 5,621,467 (hereinafter Chien). An obviousness rejection is only proper if an Examiner can demonstrate that (1) the combination of references includes all claim limitations and (2) that there is a reasonable expectation of success in the combination. The Examiner has failed to meet either of these two requirements.

Independent claim 9, from which claims 11-14 depend, recites the limitation of “detecting an approximate direction of an image edge in a block of image pixels *and establishing a filtering axis relatively parallel to said direction.*” (emphasis added). Neither cited reference discloses this limitation. Lee, which discloses a method of reducing compression artifacts in an image, indicates that an image block may be analyzed to determine which pixels in the block represent edge information and which do not. A weighted 3x3 filter is then applied to each non-edge pixel in the image. As noted by the Examiner, Lee fails to disclose “detecting an approximate direction of an image edge in a block of pixels” and therefore also fails to disclose “establishing a filtering axis relatively parallel to said direction.”

Chien, on the other hand, discloses a method of reconstructing digital video frames where blocks or portions of blocks were lost or damaged during transmission. Specifically, Lee discloses that, in the instance where little motion is detected between a frame with missing data and the immediately preceding frame, the missing data may be simply replaced with corresponding data from the preceding frame. Conversely, if significant motion does exist between the frame to be reconstructed and its immediate predecessor, Chien discloses that the missing data may be interpolated with purely intra-frame information, along a direction of any image edges detected in the regions surrounding the vacant area. Thus, while Chien discloses the step of “detecting an approximate direction of an image edge,” Chien fails to disclose the

limitation of “establishing a *filtering axis* relatively parallel to said direction.” In fact, given that a direction of an image edge is only computed to *interpolate* missing data, there is no pixel information to *filter* in accordance with the computed direction.

Thus neither Lee nor Chien disclose the claimed limitation of “establishing a filtering axis relatively parallel to said direction.”

Furthermore, the Examiner has failed to provide a reasoned explanation for the combination of the cited references. While Chien’s methods may be used to reconstruct an image having lost data due to a faulty transmission signal, and once reconstructed, may have compression artifacts reduced using Lee’s disclosed methods, neither reference disclose methods or steps useful in each others’ processes. The explanation given by the Examiner is “reducing artifacts in the presence of motion, through images with no motion, and images with significant motion.” See Office Action at p. 3. Chien, however, is unconcerned with compression artifacts in a digital image, and instead merely discloses methods for replacing data that was missing or damaged during signal transmission, where one method relies on the lack of motion, and the other one does not. Conversely Lee already assumes that the decompressed image is whole and discloses a method for reducing ringing artifacts due to the compression process. Neither reference discloses any relationship between compression artifacts in a decompressed image and image motion between subsequent image frames. Thus, the Examiner’s stated explanation as to a purported motive or benefit to the combination does not make sense.

More fundamentally, Lee discloses a two-step block reduction process where an edge map is first constructed. Then a filtering procedure is applied across the whole image where a 3x3 filter is applied to pixels that the edge map indicates as having no edge information. Since the filtering block is square, and since the edge map must be consulted on a pixel-by pixel basis, where the filtering applied to each pixel does not depend on the direction of filtering, there will never be any motive for establishing a filtering axis for filter relatively parallel to a direction of a detected edge, as doing so would provide no benefit, computationally or otherwise.

For each of the reasons stated above, the Examiner’s rejection of claims 9 and 11-14 was improper and the applicant respectfully requests that it be withdrawn.

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Amdt. dated May 16, 2006
Reply to Office action of January 18, 2006

The Examiner rejected claims 1-8 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Lee, Chien, and Simpson, U.S. Patent No. 5,754,702. Independent claim 1, from which claims 2-8 depend, includes the limitation of "detecting an approximate direction of an image edge in a block of image pixels and establishing a filtering axis aligned relatively parallel to said direction." None of Lee, Chien, or Simpson disclose this limitation (The Examiner merely cites Simpson to provide the limitation of "where said image edge and said filtering axis are not parallel to the horizontal and not parallel to the vertical orientation of said image.) Accordingly, claims 1-8 are distinguishable over the cited prior art for the same reasons as is claim 9.

The Examiner rejected claims 20-27 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Lee, Chien, and Borer, U.S. Patent No. 6,069,670. Independent claim 20, from which claims 21-27 depend, includes the limitation of "detecting an approximate direction of an image edge in a block of image pixels and establishing a filtering axis relatively parallel to said edge." None of Lee, Chien, or Borer disclose this limitation. Accordingly, claims 20-27 are distinguishable over the cited prior art for the same reasons as is claim 9.

In view of the foregoing amendments and remarks, the applicant respectfully requests reconsideration and allowance of claims 1-31.

Respectfully submitted,



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